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Title

Apparatus for automatic re-welding of packaging films

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Description

The innovation relates to a device for the automatic re-welding of packaging films, in particular films of different widths in film-wrapping machines, with a number of reels, housed rotatable on supporting rolls, from which the films can be removed using a film take-off unit.

In the case of film-wrapping machines, a manual intervention in the running of the machine is necessary when the end of the film is reached in order to weld the start of the new film web to the end of the used film web, glue it or draw in the new film.

In addition, users seek devices or machines which enable several film widths to be kept ready and these to be used without expending much time and without manual intervention.

The object of the innovation is therefore to develop a device of the type mentioned at the start so that films of different widths can also be used on it.

This is achieved according to the innovation in that the start of the film of each reel is arranged between pairs of belts or straps which can be motor-driven and through which the films can be transported and delivered to a re-welding station for re-welding.

Expediently, the belts or straps between which the film is guided can be pressed against each other by spring tension and can be moved apart using a pneumatic or hydraulic cylinder against the force of the springs.

Each pair of belts or straps is preferably provided with spring-loaded pressing jaws.

The supporting rolls of each reel are advantageously provided with their own motor drive, which can be coupled to the supporting rolls or separated from them using a coupling e.g. a friction coupling.

Connected downstream from the film take-off unit is a drag lever over the reels of which the film to be removed is guided, and each drag lever is expediently provided with a locking apparatus e.g. a friction brake in order to fix the drag lever in a desired, momentary position when changing (re-reeling) a film.

A separating station and a re-welding station are advantageously provided for the re-welding of the films, the separating station and the re-welding station being arranged at a pre-set distance from each other in the direction of travel of the film.

The re-welding station is advantageously provided with a

swivellable separating plate which can be swivelled over the end of the previous film web in order to prevent a hooking of the following film webs.

A version of the innovation offered as an example is explained in the following using the drawing, in which

FIGURE 1 shows a film-wrapping machine
schematically in section

FIGURES show in side view and in section
2a and 2b respectively the drive for the
supporting rolls of the film reels.

FIGURE 3 shows schematically in partly sectioned
side view the pairs of belts and straps
between which the starts of the films
are arranged as well as the separating
station and the re-welding station.

FIGURE 4 shows in section the separating station
and the re-welding station, a film being
guided through these stations.

FIGURE 5 shows in section the separating station
and the re-welding station, the end of a
previous film web and the start of the

following film web being shown.

FIGURE 6 shows in section the separating station and the re-welding station, the welding of the end of the previous film web to the start of the subsequent film web being represented.

Figure 1 shows schematically a film-wrapping machine 10 which is equipped with upper film reels 12, 14, 16 and with lower film reels 13, 15 and 17. The machine operates simultaneously from two film reels, in the represented example from reels 12 and 13, the starts of the two film webs F_0 (which comes from reel 12) and F_u (which comes from reel 13) being welded together at S using welding apparatus 22.

Each of the reels 12 - 17 is housed rotatable on two supporting rolls 18. The film webs F_0 and F_u are taken off the reels 12, 13 using a film take-off unit 28 and 29 respectively and each guided over a drag lever 30, 31 to the welding apparatus 22 to form the welded seam S. Arranged on a belt 26, e.g. a conveyor belt or a roller conveyor or the like is a body 24 to be packed which is guided on the belt 26 in the direction of the welded seam S

and then packed.

The taking-off from the roller conveyors, the welding with the help of the welding apparatus 22 and the packing of the body 24 are known and are not the subject-matter of the innovation.

A re-welding apparatus 32 is allocated to the upper reels 12, 14 and 16 and a re-welding apparatus 33 to the lower reels 13, 15 and 17 which are arranged directly in front of the respective film take-off unit 28, 29 in the direction of travel of the film webs.

A holding station 34 is arranged between the first reel 12 and the re-welding apparatus 32, likewise a holding station 35 is arranged between the first reel 13 and the re-welding apparatus 33, the purpose of these being described in detail below. As already stated, every one of the reels 12 - 17 is housed rotatable on two supporting rolls 18 each. As Figure 2a shows, the supporting rolls 18 of each reel are provided with their own drive 36 (e.g. an electromotor with belt drive), by which the reels can be driven both forward and rearward.

Each supporting roll 18, as Figure 2b shows, is coupled with the associated drive 36 via a friction coupling 38 so that the drive of the supporting rolls can be switched on or off as required. (Optionally, also only one of the supporting

rolls 18 of each pair can be driven).

In Figure 3 the holding station 34/35 is schematically represented.

For each film web (the film webs F_{01} , F_{02} and F_{03} of the upper reels 12, 14 and 16 are represented) at least one pair of belts or straps 40, 42 are provided which are guided over discs or rolls which are not described in more detail. Each pair of belts 40, 42 can be driven by a drive which is not shown, in one or the other direction of rotation or travel. The two belts 40, 42 of each pair are, as represented in Figure 3, arranged next to each other or above each other, so that the start of the film web in question F_{01} , F_{02} , F_{03} , is guided through between the internal sections, facing each other, of the belts 40, 42.

As is shown for the film webs F_{02} and F_{03} , the start of each web is held between the belts or the straps 40, 42 while the film web F_{01} , which is in use, can pass freely between the two belts 40, 42.

Each pair of belts 40, 42 is provided with pressing jaws 46, 48 which are pressed by springs 50, 52 against the internal sections 20, 21 of the belts 40, 42 so that the starts of the film webs are clamped and held between the pressing jaws, as is represented for the film webs F_{02} and F_{03} .

The pressing jaws 46, 48 can however be moved apart against the force of the springs 50, 52, e.g. using pneumatic or hydraulic cylinders, not shown, as is represented for the film web F_{01} , so that the latter can pass freely between the belts 40, 42.

The associated film web then runs from the pair of belts 40, 42 in question through a stationary guide 44 to the respective re-welding apparatus 32, 33, which is formed from a separating station 54 and a welding station 56 which are a pre-set distance A apart in the direction of travel of the film web as is represented in Figure 4.

The device according to the innovation operates as follows. As already stated, the device according to Figure 1 operates simultaneously from the two reels 12 and 13. Further films of the same, in particular however also of different, widths are kept ready on the reels 14 - 17.

By way of example, the film width is now to be changed on the above reels, i.e. if the film of reel 14 is to be used for example, the start of the film web of reel 14, i.e. the start of film web F_{02} (Figure 3) must be welded to the film F_u , while the previous film F_{01} is severed.

To this end, the previous film F_{01} is rewound, i.e. the

currently used reel 12 is rotated rearward using its supporting rolls 18 and its drive 36, and the film F_{u1} with reel 13 rotated forward using the supporting rolls 18 and its drive 36, until the welded seam S has passed back into the re-welding apparatus 32 and is roughly in the position shown in Figure 4 between the separating station 54 and the re-welding station 56. In the process, it is pulled upwards and pushed down or vica versa. In the separating station 54, as is indicated by an arrow in Figure 4, the film web F_{01} is severed and then pulled back somewhat, so that it comes to rest between belts 40, 42 allocated to it, of the holding station 34.

There, the start of the film web F_{01} is held by pressing together the pressing jaws 46, 48 using the springs 50, 52. As Figure 5 shows, the re-welding apparatus 32 is now open, and a guiding plate or separating plate 58 is swivelled into the opening between the upper part and the lower part of the re-welding apparatus 32.

Then the film F_{02} which comes from reel 14 is drawn off from reel 14 using the belts or straps 40, 42 allocated to it, and introduced into the re-welding apparatus 32, in which, as Figure 5 shows, it comes to rest above the separating plate 58. The separating plate 58 serves to prevent a

hooking, e.g. with the end of the previous film web, when introducing the film web F_{02} into the re-welding apparatus 32.

The separating plate 58 is now swivelled out of the area of the separating station 54 and the welding station 56 again, the upper part of the re-welding apparatus 32 is moved in the direction of the lower part, as is shown in Figure 6 by an arrow, and the start of the new film web F_{02} is then welded to the film web F_u , which comes from the lower reel 13, in the welding station 56.

Then, in the holding station 34, the belts 40, 42 which are allocated to the film F_{02} are moved apart (as is represented in Figure 3 for film F_{01}) so that the film web F_{02} can move through freely and unhindered between the belts 40 and 42. Furthermore, the re-welding apparatus 32 is opened again and brought into the position shown in Figure 3, whereupon the film web F_{02} is taken off from the reel 14 using the film take-off unit 28 and wound forward until the welded seam is located again in the position shown in Figure 1 between the upper film F_{02} and the lower film F_u .

The old welded seam S, which is represented in Figures 4, 5 and 6, as well as the remainder of the previous film web

remains suspended from the film web F_u and is taken along and packed with it.

The supply of the films from reels 14 and 16 as well as from reels 15 and 17 to the holding station 34, 35 takes place over optionally drivable belts 60.

It was stated that for each film at least one belt 40 and at least one belt 42 is provided. In practice however, a number of belts 40 and 42 are arranged next to each other, i.e. across the plane of the drawing, corresponding to the maximum width of the film webs to be processed. Expediently, each individual belt or strap of such a belt assembly can therefore be individually pressed by a spring 50 or 52 against the film, or the entire belt or strap assembly can also be pressed together against the film and also be raised again from it. The film webs are, as already stated, each guided over a drag lever 30 or 31, which serve to compensate for the inertia and braking torque of the motors and other moving components, and each drag lever is provided with a locking device, e.g. a friction brake, in order to be able to fix the drag lever in a desired momentary position when re-reeling, i.e. when changing a film, so that the welded seam S always comes to rest between the separating station and the welding station.

Patent Claims

1. Device for the automatic re-welding of packaging films, in particular films of different widths in film-wrapping machines, with a number of reels housed rotatable on supporting rolls, from which the films can be removed using a film take-off unit, **characterized in that** the start of the film of each reel (12, 13, 14, 15, 16, 17) is arranged between pairs of belts or straps (40, 42), which can be driven by motors, by which the film belts can be transported and delivered for re-welding.
2. Device according to claim 1, **characterized in that**, for each pair of belts, the belts (40, 42) between which the film web is guided can be pressed against each other using spring force and can be moved apart against the force of the springs (50, 52) using a pneumatic or hydraulic cylinder.
3. Device according to claim 2, **characterized in that** each pair of belts (40, 42) is provided with spring-loaded pressing jaws (46, 48).
4. Device according to claim 1, **characterized in that** the

supporting rolls (18) of each reel (12, 13, 14, 15, 16, 17) are provided with their own motor drive (36) which can be coupled to the supporting rolls (18) or separated from them using a coupling (38), e.g. a friction coupling.

5. Device according to claim 1, where a drag lever is connected downstream from the film take-off unit, over the reels of which the reel web to be taken off is guided, **characterized in that** each drag lever (30, 31) is provided with a locking apparatus, e.g. a friction brake, in order to fix the drag lever in a desired, momentary position when re-reeling (changing) a film web.
6. Device according to claim 1, **characterized in that** a separating station (54) and a welding station (56) are provided for the re-welding of the films, and the separating station (54) and the welding station (56) are arranged a pre-set distance A apart in the direction of travel of the film.
7. Device according to claim 6, **characterized in that** the welding station (56) is provided with a swivellable separating plate (58) which can be swivelled over the end of the previous film web in order to prevent a

hooking of the following film web.

8. Device according to claim 7, **characterized in that** the following film web can be welded to the previous film web in the welding station (56) on the other side of the original welded seam S.

Fig. 1

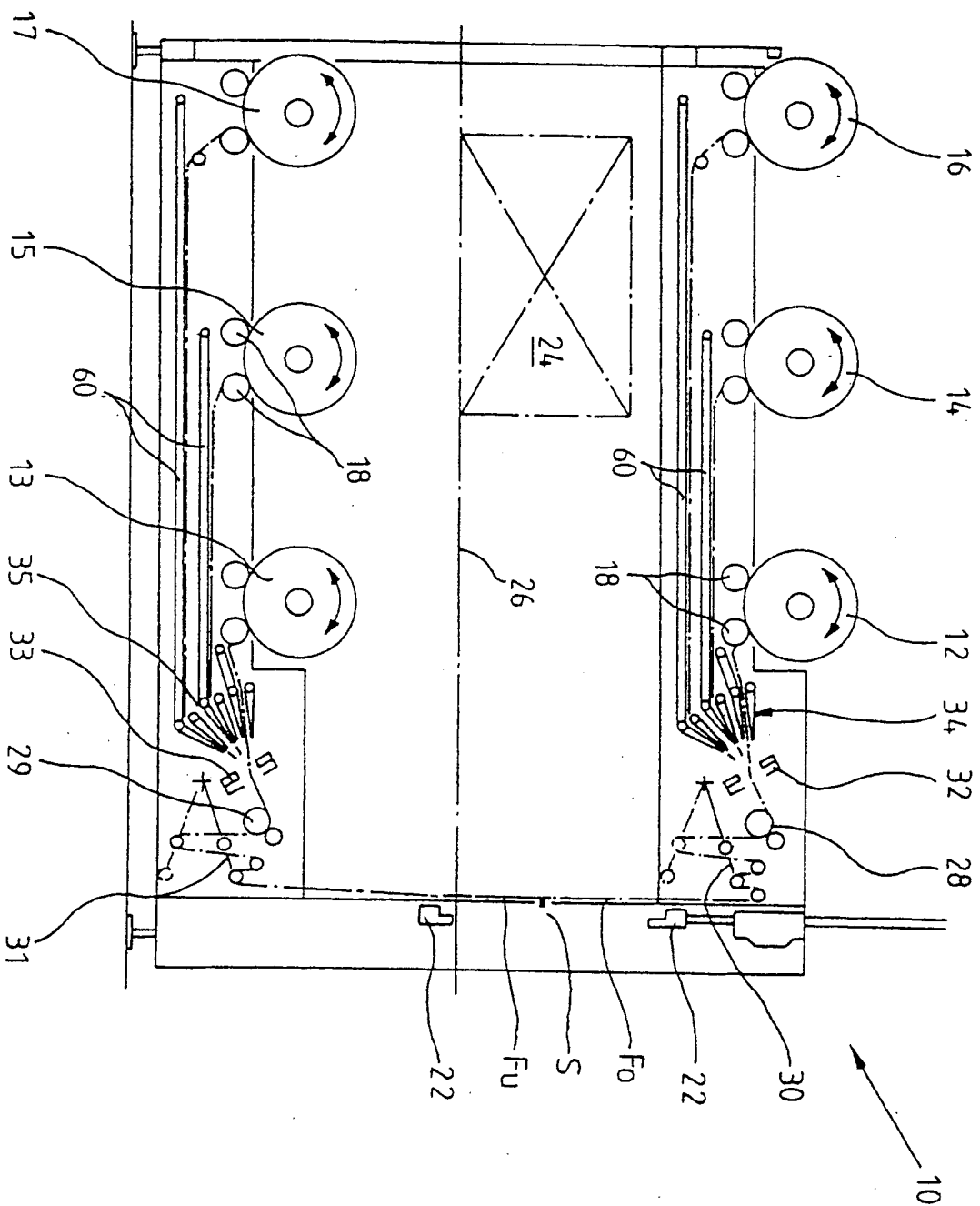


Fig. 2a

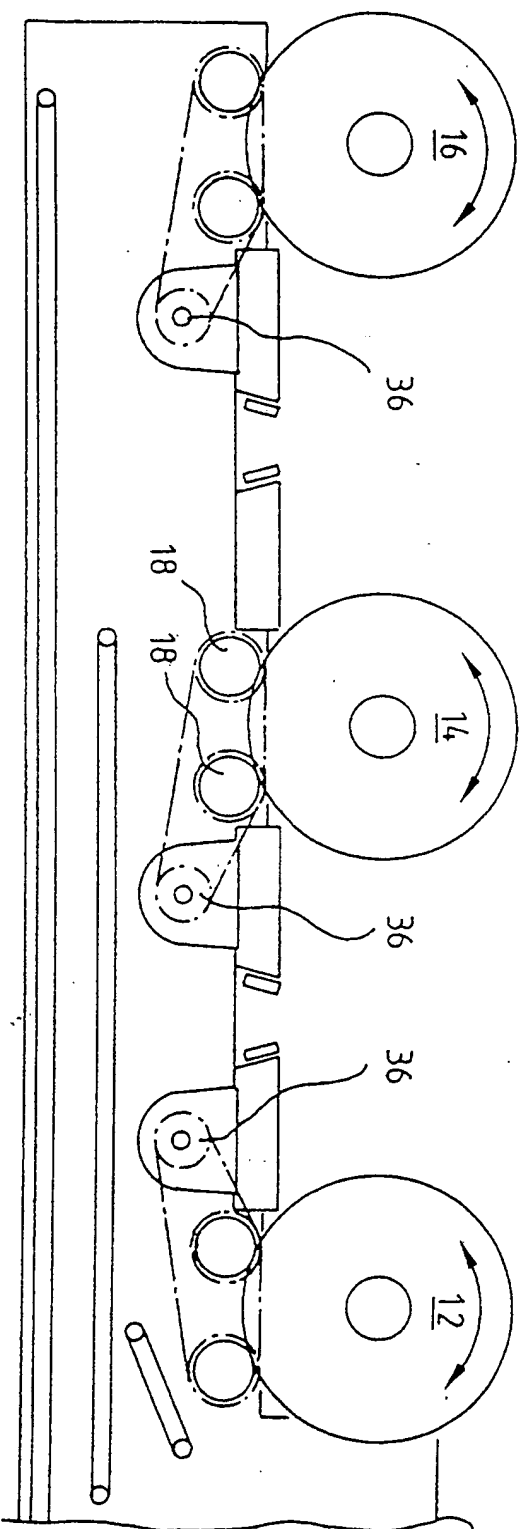


Fig. 2b

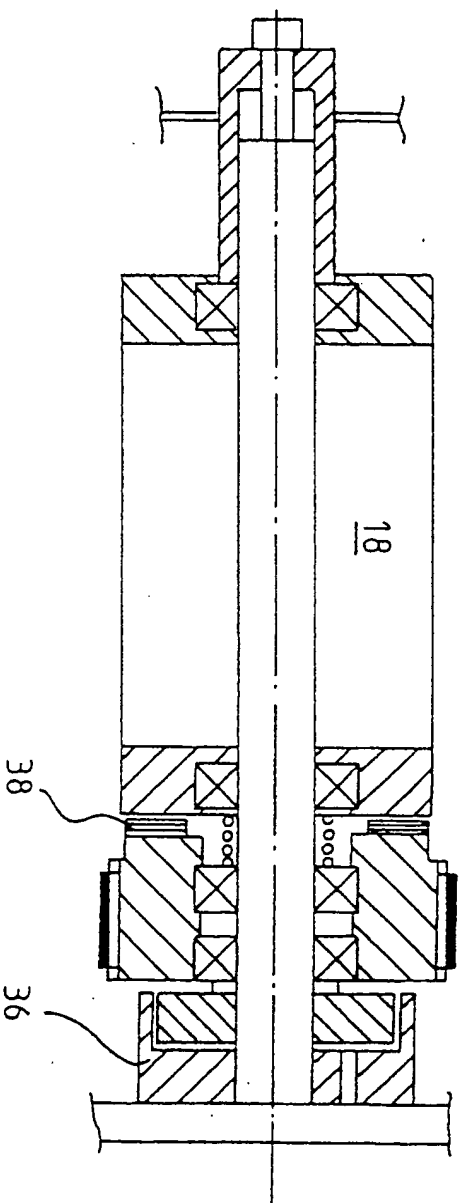
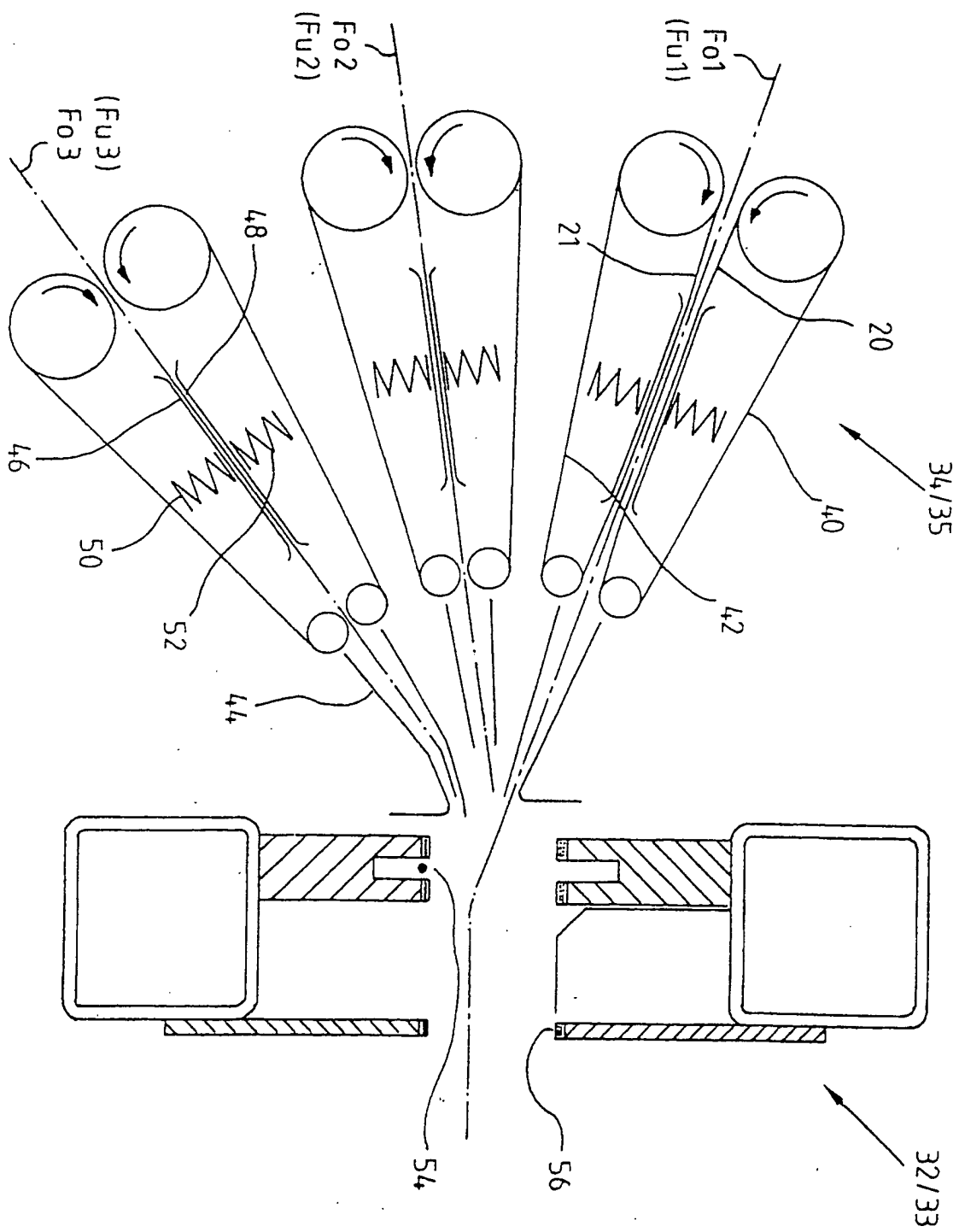


Fig. 3



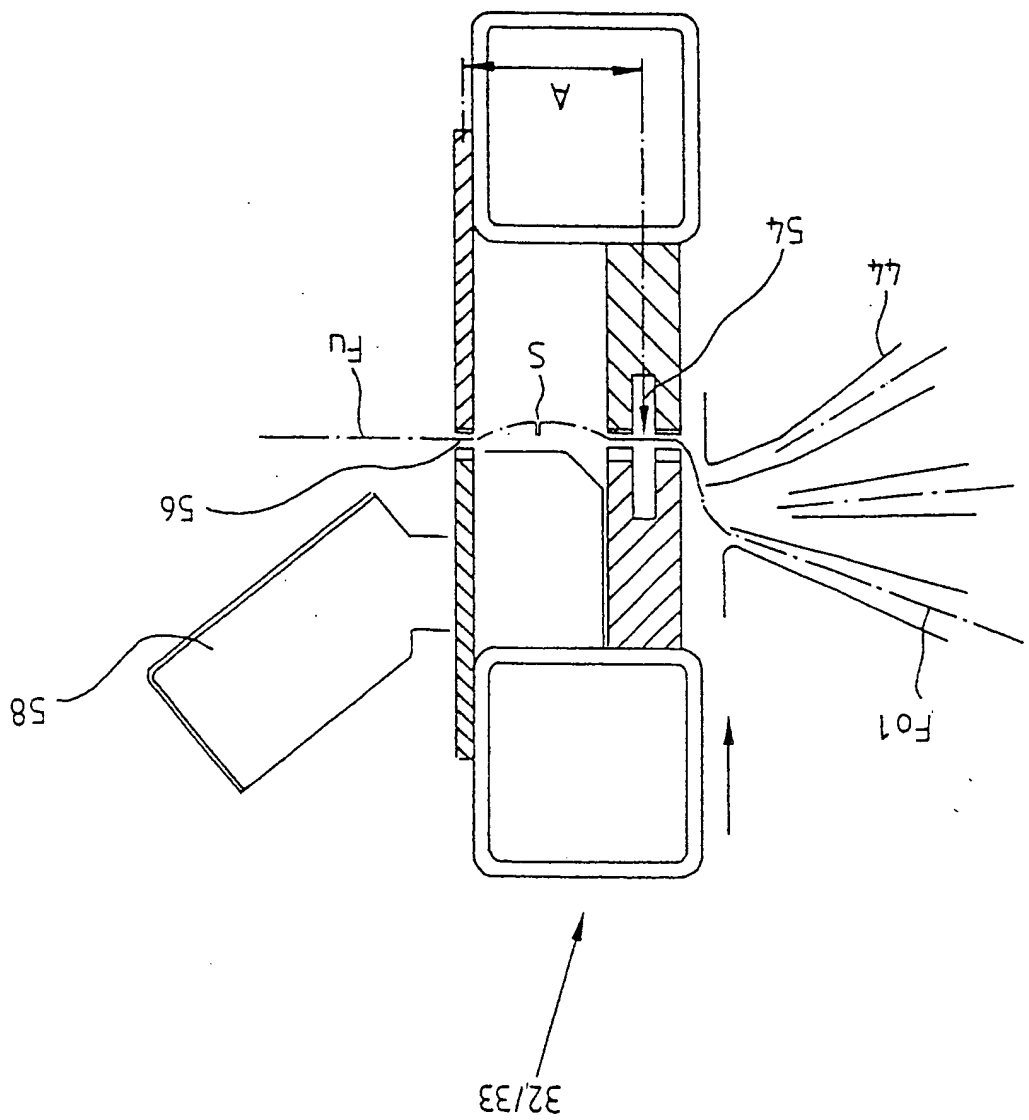
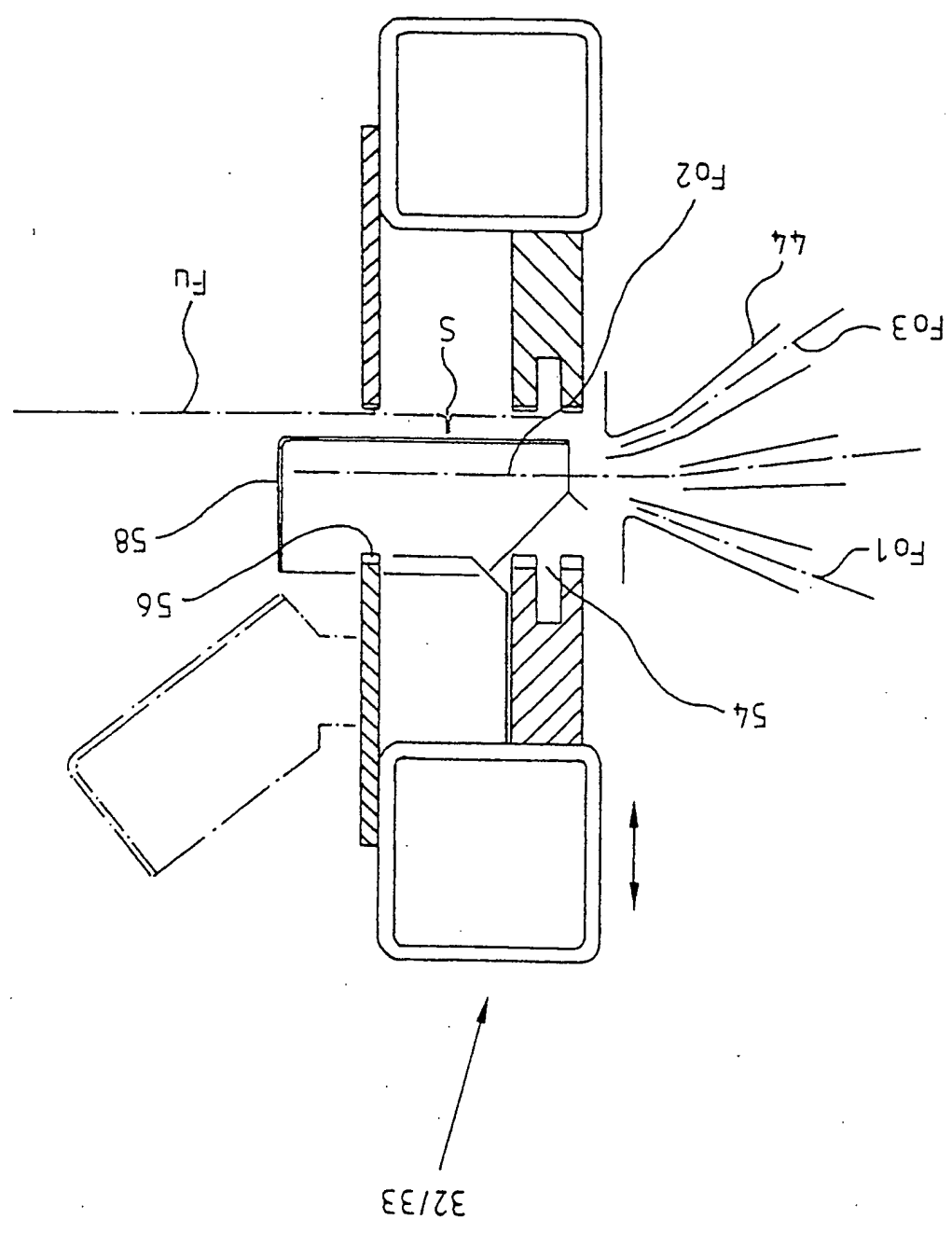


Fig. 4

Fig. 5



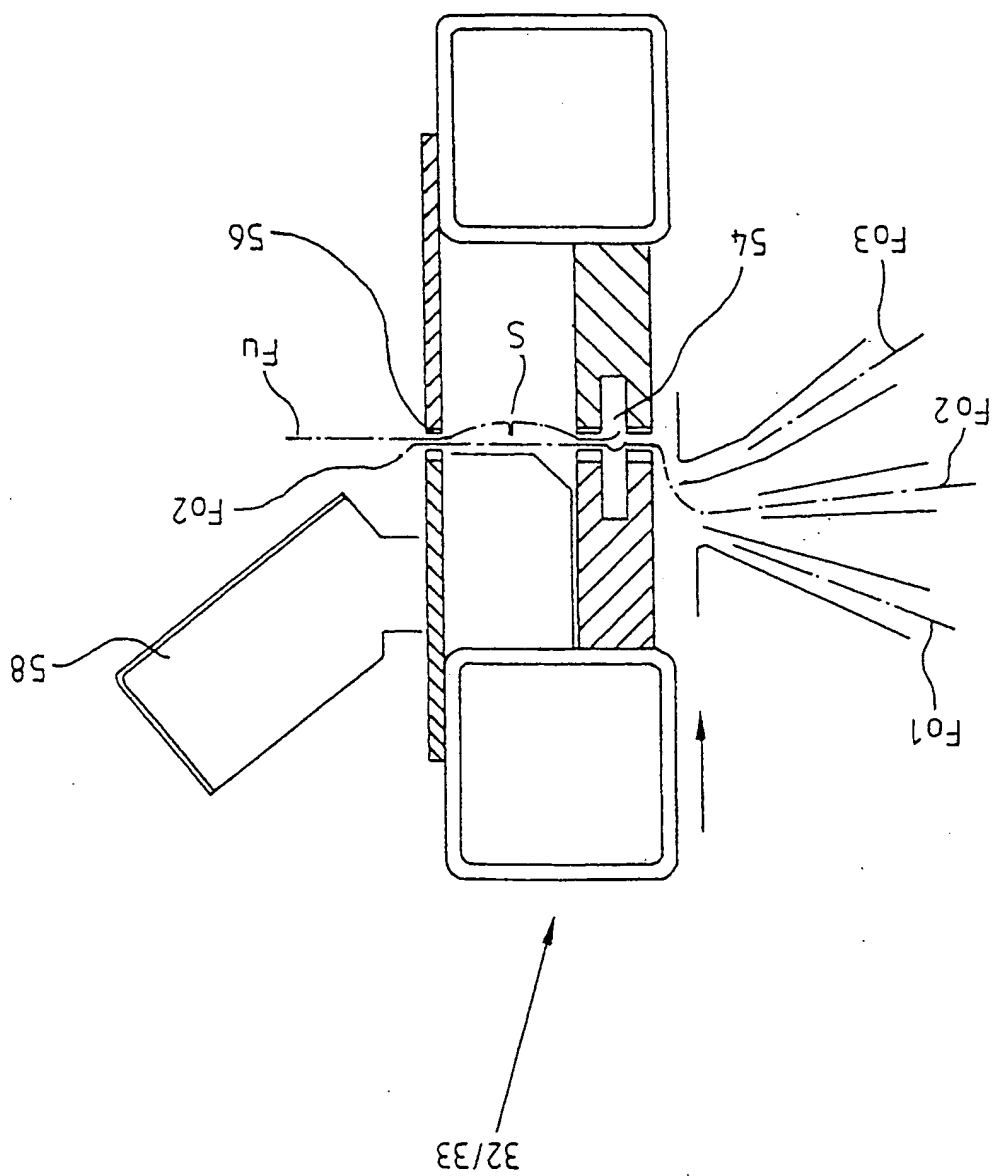


Fig. 6